

**CLAIMS**

What is claimed is:

1. A non-linear dispersive transmission line assembly for producing high power radio frequency electrical signals, including a transmission line having a plurality of series connected inductors each incorporating saturable magnetic material to provide non-linearity, a first array of capacitors interconnecting outermost ends of immediately adjacent pairs of the inductors, and a second array of capacitors interconnecting outermost ends of immediately adjacent pairs of inductors, with the second array interconnection points being spaced by one inductor from the first array interconnection points, and means for applying a first magnetic field to the transmission line in a direction substantially perpendicular to the direction of a second magnetic field produced in the transmission line by the application thereto of a high voltage input pulse to promote the formation of a very short duration shock front at the leading edge of the input pulse when propagating through the transmission line and reduce energy competition and dissipation in the transmission

line and thereby increase transfer of energy from the input pulse to the output high power radio frequency electrical signal and reduce attenuation of the output high power radio frequency electrical signal.

2. An assembly according to claim 1, wherein the first array capacitors comprise a sub-array of coupling capacitors connected in parallel with one another with each connected to an outermost end of immediately adjacent pairs of the inductors and a sub-array of linking capacitors connected in series with one another across the first array connections to the inductor outermost ends with each linking capacitor linking the two coupling capacitors connected across the outermost ends of the pairs of the inductors.
3. An assembly according to claim 2, wherein the second array capacitors comprise a sub-array of coupling capacitors connected in parallel with one another with each connected to an outermost end of immediately adjacent pairs of the inductors, and a sub-array of linking capacitors connected in series with one another across the second array connections to the inductor outermost ends with each second array linking

capacitor linking the two second array coupling capacitors connected across the outermost ends of a pair of inductors.

4. An assembly according to claim 3, wherein the inductors are each in the form of ferrite beads threaded on to lengths of electrically conductive wire or are in the form of an electrically conductive helical winding wound around a magnetic toroid.
5. An assembly according to claim 3, wherein the inductors are series interconnected in a linear sequence and wherein the first and second array capacitors are located substantially transversely to the linear axis through the inductors.
6. An assembly according to claim 5, wherein the first magnetic field application means is a solenoidal electrical conductor winding extending around the linear axis operable to carry a pulsed or direct current to produce an axial magnetic field through the magnetic material of the inductors.
7. An assembly according to claim 5, wherein the first magnetic field application means is a plurality of permanent magnets arranged unlike pole to unlike pole

in a line substantially parallel to and spaced from the linear axis and operative to produce a predominantly axial magnetic field through the magnetic field of the inductors.

8. An assembly according to claim 3, wherein the inductors are series interconnected and located substantially in parallel to one another substantially transversely to the linear axis through the assembly.
9. An assembly according to claim 8, wherein the first magnetic field application means is an array of permanent magnets arranged substantially parallel to and externally spaced from the assembly linear axis with like poles directed towards the linear axis.
10. An assembly according to claim 8, wherein the first magnetic field application means is an array of permanent magnets arranged such that each inductor includes two magnets of the array located one at each end of the inductor and operative to produce a substantially axial magnetic field through the inductor magnetic material.

11. An assembly according to claim 1, including a container in which the capacitor arrays and inductors are located.